Claims

We claim:

1.) A surgical stapler comprising:

a removable staple cartridge;

a handle assembly with a pivot screw;

an actuating trigger pivotably connected to a combination staple forming mechanism and a staple feeding mechanism secured in a frame, wherein said staple feeding mechanism includes a rail to guide staples, contained within said removable staple cartridge, into a staple forming position while said staple forming mechanism utilizes a forming tool to lock said removable staple cartridge into said handle assembly;

a trigger release mechanism.

2.) The surgical stapler of Claim 1, wherein said handle assembly comprises:

a body made up of two mating halves having a forward portion housing said staple mechanism and said staple feeding mechanism combination;

a rear handle portion;

a pivot screw;

built in guides at the front end of said forward portion for said staple forming mechanism;

built in lips on said rear handle portion interior walls proximal to the outside edges for said trigger release mechanism.

3.) The surgical stapler of Claim 1, wherein said handle assembly, said actuating trigger, and said removable staple cartridge are detachable from one another.

4.) The surgical stapler of Claim1, wherein said actuating trigger is designed to operate in three main positions:

fully open when said removable staple cartridge is disengaged from said forming tool and can be removed and replaced by a new one;

ready-to-use position when the following actions take place:

1.) the gear teeth of said actuating trigg r forces a forming tool to slide between the guides inside the walls of said forward portion housing, wherein the rack and pinion action between said teeth of said actuating trigger and th teeth of said forming tool guarantees a very precise and smooth motion of said forming tool inside said guides and a window in a tower of said removable staple cartridge;

2.) snap features of release assembly snap into housing lip;

3.) said forming tool engages into said window of said removable staple cartridge and aligns and locks said removable staple cartridge into position completely aligning said forming tool to the centerline of a staple ready to be formed preventing jamming of said staple during closing of the wound or incision;

fully closed position when the following actions take place:

1.) the top surface of said actuating trigger hits the inside top wall of said rear handle portion of said handle assembly;

2.) when said gear teeth of said actuating trigger forces said forming tool downward to make contact with the top section of a staple so that extension legs of said forming tool start the deformation of said legs;

3.) when the mid section of said staple is resisted by said anvil continuing until the edge of said forming tool has completely reached bottom and presses against the top section of said staple;

4.) when said forming tool has completely finished its downward path the side legs of said staple clear the lips of said removable staple cartridge and said staple is free to clear said removable staple cartridge and be implanted into the wound or incision.

5.) The surgical stapler of Claim 4, wherein said actuating trigger is returned to the ready-to-use position after being in said fully closed position by the extension of a leaf spring.

6.) The surgical stapler of Claim 1, wherein said removable staple cartridge is an assembly comprising:

staples;

a rail comprising: a high strength steel plate formed to provide the necessary surfaces for said staples to ride on; an anvil formed at the front of said rail to provide support to said staple during the forming operation; large holes that provide a user with a passive visual indication of the number of said staples in said removable staple cartridge;

a cartridge housing made out of a resilient plastic material assembled to said rail by heat staking or ultrasonic welding cartridge pins to the holes locat d on the side surfaces of said rail;

a coil spring retained inside a cylindrical cavity allowing said coil spring to extend only in a longitudinal direction of said removable staple cartridge;

two lips built-in said cartridge housing for retaining said staple at the front in place and ready to be formed; an end cap made out of plastic and assembled to said rail via two snaps located at the bottom of said cap, wherein said end cap surfaces slide und r the bottom surface of said cartridge housing;

a pusher to provide a constant force against said staples via the compression force exerted by said coil spring;

two cantilever snaps at the back end of said cartridge housing that provide the means of engagement to said handle housing when said removable staple cartridge is loaded into said surgical stapler;

a tower at the front end of said cartridge housing with an opening that provides access to said forming mechanism once said actuating trigger is rotated to the ready-to-use position and forces said forming mechanism into perfect alignment with said staple.

7.) The surgical stapler of Claim 6, wherein said staples lay between said cartridge housing and said rail at such an angle that when said surgical stapler is in use the tips of said staples face perpendicular to the wound or incision to be closed.

8.) The surgical stapler of Claim 6, wherein said staples are constrain d by the inside walls of said cartridge housing and the tips ride on the surface of said rail.

9.) The surgical stapler of Claim 6, wherein the mid-section of said staple is restrained by said anvil and the side legs of said staple by the inside surfaces of said cartridge housing.

10.) The surgical stapler of Claim 6, wherein once said staple is formed and pulled out of said removable staple cartridge a new staple is immediately located in place by the force exerted by said coil spring and said pusher.

11.) The surgical stapler of Claim 1, wherein said trigger release mechanism is an assembly comprising:

a leaf spring;

two latches with snap features made out of a resilient plastic mat rial which can be heat staked or ultrasonic weld d to said leaf spring;

two release buttons.

12.) The surgical stapler of Claim 11, wher in said snap features are engaged on a lip located on the inside wall of said handle assembly when said surgical stapler is in said ready-to-use position and prevent said actuating trigger from fully opening during the normal operation of said surgical stapler.

13.) The surgical stapler of Claim 11, wherein said release buttons are pressed and said snap features clears said handle assembly lip allowing said actuating trigger to fully open permitting the discharge of an empty said removable staple cartridge.

14.) The surgical stapler of Claim 11, wherein said snap features when forced against the inside surface of said handle assembly during said closing motion do not restrict said actuating trigger.

15. A surgical stapler with a removable staple cartridge, wherein said cartridge is preferably in a disposable form, utilizing a combination of a staple feeding mechanism and a staple forming mechanism secured in a frame and an actuating trigger functionally connected to both said staple feeding mechanism and said staple forming mechanism.